Tariff Reduction in a Small Open Economy

Vaqar Ahmed * and Cathal O'Donoghue

During the late 1990s, Pakistan managed to significantly liberalize its external sector, and by 2002, the average tariff rate was under 17 percent which was well below the average in comparative countries. Using a social accounting matrix (SAM) for 2002, we develop a computable general equilibrium (CGE) model to evaluate the impact of tariff reduction in Pakistan. Our analysis goes beyond the usual trade-focused general equilibrium studies for Pakistan, as we also conduct a detailed sensitivity analysis to check the robustness of welfare-related results. Our findings suggest an overall positive impact of slashing tariff rates on macroeconomic, and welfare indicators.

Keywords: Trade liberalization, Economic growth, Welfare computable general equilibrium model

JEL Classification: C68, D58, O24, I3

I. Introduction

During late twentieth century, the developing countries started to embrace the process of globalization which included a reduction in trade barriers. The national markets started to get financially and operationally integrated into the global markets. With increased technological innovation, firms were forced to adopt the new forms of econo-

* Corresponding Author, Deputy Chief, Planning Commission of Pakistan, Pakistan Secretariat, Islamabad, Pakistan, (Tel) +92-300-5543136, (E-mail) vahmed@gmail.com; Head, Teagasc Rural Economy Research & National University Of Ireland, Galway, University Road, Galway, Ireland, (Tel) +353-91-493043, (Fax) +353-91-524130, (E-mail) Cathal.ODonoghue@teagasc.ie, respectively. Authors would like to acknowledge comments / technical help by Paul Dorosh and Stefan Boeters. The usual disclaimer applies.
[**Seoul Journal of Economics** 2010, Vol. 23, No. 4]

mies of scale and the governments were forced to reduce their role in the (free) market system. Trade liberalization which initially started in the developed countries was reciprocal and multilateral. The later was based on the famously known most-favoured nation clause (see Davey and Pauwelyn 2000). Opening up the previously restricted trade regimes paved way for the global opportunities of exchange available for all countries. See Hillman (2003), Horn and Mavroidis (2001), and Ethier (2001, 2002).

A. Rise and Fall of the Doha Development Agenda

An efficient and flexible trade policy intervention is known to help economies in smoothing the overall business cycles and external shocks.[1] In the recent past trade policy in most countries has revolved around the liberalization initiative. This involves: a) the reduction in import restrictions such as tariffs and quotas, and b) reduction or elimination of subsidies that create distortions in the productive sectors of the economy. Theoretically both these strands of trade liberalization are pro-efficiency (but not necessarily pro-poor). Countries need to embark simultaneously on revamping the trade and domestic competition policies. The notion that free trade can actually generate efficiency will depend upon the promotion of competitiveness in all markets and a reduced government intervention in the form of minimum regulatory arrangements (see Tarjanne *et al.* 1995).

Since the establishment of the World Trade Organization (WTO) in 1995, international efforts towards a freer trade environment have increased. The inaugural ministerial conference in Singapore highlighted that the differences between the developed and developing economies fell under four main categories; investment protection, competition policy, transparency in government procurement and trade facilitation. These disagreements are also famously known as the *Singapore Issues*.[2] Most of the WTO meetings except for the Doha round in 2001, could not achieve the desired agreement across countries and regional blocks. The Doha Development Round focused specifically on the lowering of trade

[1] This policy also interacts heavily with the exchange rate policy of a country where an overvalued currency can hurt its own exports and an undervalued currency can lead to an increased burden of debt and higher import cost in value terms. For applied methods in trade policy analysis, see Francois and Reinert (2008).

[2] See Khor (2004) for a detailed description on the Singapore issues in the WTO: implications and recent developments.

barriers such as the import duties and licenses, quotas, tariffs, export, and production subsidies, export licenses and various non-tariff barriers.[3] The non-tariff barriers to trade commonly include antidumping and countervailing duties. However, many rich countries also impose health and safety regulations and unconventional quality requirement standards (which are at times hard to meet particularly in the case of poor countries). These barriers hurt efficiency as they run against the essence of comparative advantage literature.

The Cancun meeting in 2003 was unsuccessful due to disagreements on issues related to the farm subsidies and access to markets.[4] The main hindrances were the European Union's Common Agricultural Policy and the agro-subsidies to the farmers in the United States. In 2004, Geneva talks brought about an agreement where US, EU, Brazil, and Japan now showed readiness to end the export and agriculture-oriented subsidies and also reduce the tariff barriers. The developing countries were allowed to protect key industries while broadly lowering the tariffs on manufacturing sector imports. In the 6^{th} WTO ministerial conference held in Hong Kong a deadline was agreed upon for eliminating agricultural export subsidies by 2013. The next Geneva talks in 2006, however, collapsed with the EU blaming US for the failure as the demands put forward by the US in return for the reduction in farm subsidies proved to be unacceptable to the developing countries, eventually leading to a suspension of the Doha negotiations.

Several economists at the quantitative level have been interested in finding out the relationship between trade, growth, and welfare (see Santos-Paulino and Thirlwall 2002). There is not much consensus on the causation, however the general understanding is that increased trade has the potential to promote growth and welfare (Cockburn *et al.* 2008). We intend to investigate this view in this paper. Section 2 focuses on trade policy linkages and the role of general equilibrium models. Section 3 provides the experience of trade liberalization in Pakistan. Section 4 describes the structure of our CGE model and its data. Finally, using this CGE model, we conduct policy experiments to look at the impact of tariff reduction at the same time complimenting this exercise with a detailed sensitivity analysis with respect to the choice of parameters and closure rules.[5]

[3] See Page (2004) for principal issues in the Doha negotiations.

[4] See Yallapragada *et al.* (2005) for a discussion on the collapse at Cancun.

[5] The closure rules are the set of assumptions specified in the model in order

II. Trade Policy Analysis

The socio-economic impacts of trade liberalization are usually deeper than often presumed. One is faced with various difficult questions that have multiple and inter-related answers.[6] Even after a plethora of quantitative research, one is unable to find an answer based on consensus. For a detailed review of these issues see Winters *et al.* (2004), Krueger (1995), and Rodrick (1999).

A. Trade, Growth, and Welfare

Before opening up the trade regimes, governments need to put in place investment-inducing competition and regulatory policies, safeguard measures and a mechanism for resolving issues such as the anti-dumping and production subsidies (see Bhagwati *et al.* 1996). The effects of free trade on the population of a country (particularly the poor class) will amongst other things depend upon whether they are net consumers or producers (of a good being liberalized). If on the production side free trade leads to efficiency, then this can in turn bring about greater specialization. The enhanced specialization can lead to a decrease in production costs which in turn reduces domestic prices. If there is domestic demand for the good produced by the poor, then they gain in the form of increased earning opportunities as well as increased consumption. In the case where these goods are exported, then the first round gain will go to the final sellers in the form of profits, however, the second round effects will impact the welfare in general. See Bouët (2006) for a discussion on what the poor may expect from trade

to ensure equilibrium.

[6] Some questions highlighted in the literature include: what are the prerequisites for moving towards free trade? Will trade-led economic growth lead to poverty reduction and redistribution of wealth? Should the government have targeted intervention to safeguard the losers? The government itself is loosing revenue when tariff comes down. Should it bridge the gap by increasing direct or indirect taxes? What happens when imports become cheaper? Are the benefits transferred to the consumers (in the form of reduced prices)? Do the domestic producers gain from the cheaper raw material imports and inputs such as oil and petroleum products? What will be the impact on overall employment and child labor? Would there be an exchange rate adjustment? Will agriculture sector, the main stake of poverty ridden population benefit from increased openness? What will be the social benefits of increased trade? Will technology transfer take place? Finally who is the net gainer from the price and quantity effects of trade liberalization?

liberalization. See also Wood (1995), Bhagwati *et al.* (2002).

The trade structure in low-income countries is heavily dependent upon a low value commodity base (*e.g.,* textile in the case of Pakistan). This then brings in the risk and uncertainty considerations in the overall analysis, *i.e.*, the benefits of trade liberalization may not be fully realized if this particular commodity is subject to unfavourable price/ supply shocks in the international market. Hence the logic for diversifying exports and at the same time improving their quality. The increased and less expensive inflow of goods can harness technology-adoption practices, where the medium and long term benefits can be reaped from technology transfer. There may also be a structural change in the factor market, when more units of labour and capital are required in the relatively higher paid sectors producing products that have a dynamic global demand. See Shafaeddin (2005) for a detailed analysis.

The benefits from trade can significantly alter the social structures. For example, the increased household income may act as a protection from child labour and eventually increasing the school enrolment rates, which in turn could add to the future local and national productivity. The increased employment of women may help in narrowing the gender gap. As the range of imported goods increases, new skills and traits will follow. This is particularly true for productive sectors. Many developing economies are already benefiting from reverse-engineering. See Jacob and Meister (2005), and Krugman (1995).

The advantages of a liberalized trading environment also rest heavily on the institutional developments in the country. The government needs to focus on: a) optimal resource allocation, b) design an incentive and safeguard structure, where experimentation and innovation could be encouraged, c) business friendly regulations, d) lean but efficient bureaucracy, and e) integrating the poor in the policy making environment. Economic governance is an issue that may be a long term process of reform, however, if the excessive rent-seeking behaviour is not curbed the potential of economic and social gains may be minimal. Foreign direct investment gets repelled from a country; where protection of assets and profits is not guaranteed, there are delays in litigation and arbitration procedures, restrictive labour practices, weak land regulations, property rights not defined, weak transport and communication infrastructure. See Kydd *et al.* (2002).

B. Quantifying Trade Policies

A variety of quantitative models have been used for the analysis of trade policies. There is a vast literature on how economists have used these models for studying the growth and welfare impacts of trade. Econometric models have been constructed and used for ex post analysis of trade liberalization. On the other hand, CGE and partial equilibrium models have been used for ex ante analysis (for national as well as global trade modeling). See McKibbin (1996) for a comparative analysis of modeling approaches. The commonly used gravity models are econometric in nature and try to capture: a) the positive relation between the two country's trade volumes and their size of GDP, and b) the inverse relation between two-country's trade volume and their trade costs (see Anderson 1979). The Global Trade Analysis Project (GTAP) has also facilitated efforts towards standardizing practices in trade-focused general equilibrium modeling (see Hertel 1999). For details on CGE experiments in the context of the Doha development round, see Anderson *et al.* (2003, 2005), Brown *et al.* (2003), Cline (2004), Francois *et al.* (2003), OECD (2003), and UNCTAD (2003). For overall survey on modeling methods for trade policy, see Piermartini (2006), Khan (2005), and Cloutier *et al.* (2003).

There are pros and cons associated with almost all forms of quantitative models. The partial equilibrium models regardless of their size ignore the inter-sectoral interactions. Similarly, large-scale macroeconometric models based mainly on the Keynesian tradition ignore the general equilibrium effects. These models are, in fact, at times referred to as the demand-side disequilibrium models. The CGE models, on the contrary, are widely used in the trade policy assessment and evaluation but even these models have been criticized due to the specification issues as these models use fixed production and technology coefficients and most of the parameters are conventionally derived from a base-year social accounting matrix (SAM) where the results also depend heavily on the choice of the base-year itself.[7] For discussion on the functional forms used in CGE models, see Pauw (2003), Willenbockel (2002), Annabi *et al.* (2006), and Bohringer *et al.* (2004).

The removal or reduction in import tariff in a small country (such as Pakistan) can bring about several interrelated results, namely: a) the

[7] Some years show extraordinary boom/bust conditions. The usual convention is to choose a year that exhibits the (average) medium-term performance of the economy.

domestic price of the imported good decreases by the amount of the tariff for producers and consumers, b) domestic production of the imported good decreases, c) domestic consumption and import of the good under consideration increase, d) welfare level in terms of poverty and inequality may change, and e) the real income of the nation's scarce factor declines.

Cockburn *et al.* (2008) draw seven basic results from the CGE models constructed and used for Bangladesh, Benin, India, Nepal, Pakistan, Philippines, and Senegal. The model specifications were kept similar to a maximum possible extent. The main lessons are: a) liberalization of trade increases welfare and reduces poverty marginally, b) liberalization of trade is pro-urban and may increase poverty in rural areas, c) industrial output increases more than agriculture as a result of a stronger export response and greater input cost savings, d) relative wages increase, e) income tends to fall more in rural areas (in nominal terms), f) nominal consumer prices fall more in industry[8] than agriculture or services, and g) the effects of trade liberalization on the cost of living varies from country to country. In case of Pakistan, authors find that trade liberalization is pro-urban in terms of income and consumption. This is because, first in the case of incomes, the urban households have a greater reliance on relatively stable sources of income, whereas in the case of rural households the reliance is mainly on falling returns from the relatively abundant factor of production, *i.e.,* land. Second, on the consumption side, rural households relatively consume more agricultural goods, whereas the main reduction in tariffs usually first impacts the industrial goods, which are consumed relatively more by the urban households.

III. Trade Liberalization in Pakistan

The initial efforts towards trade liberalization in Pakistan started in 1960s. However, even until the 1980s, the imports and export restrictions were high.[9] The private sector was still haunted by the past experiences of nationalization. During the 1970s, Pakistan pursued a policy

[8] Global and regional economic cooperation in the industrial sector is favored in the recent rise in free trade agreements (FTAs) across various countries. Kim and Zhan (2006) study how similarities of industrial structures and regional trade biases can act as indicators for establishing a China-Korea-Japan FTA.

[9] For details see Guisinger and Scully (1991).

of import substitution which in fact required high tariffs in order to protect the local nascent production structure. The non-tariff barriers were also high during this phase. Promoting pro-liberalization views, the caretaker government of 1993 formed a Tariff Reforms Committee with the objective of revamping the tariff structure of the country over the next three years. This initiative was one component of the overall reforms package aimed at deregulating, privatizing and liberalizing the economy along with focus on social sectors in order to sustain economic growth for a longer term period. The prime example at that time was that of the East Asian economies. After initial liberalization process, these countries reaped multifarious economic benefits that were not only limited to the balance of payments but also positively impacted the human capital accumulation as technology transfer came in along with the foreign direct investment. See World Bank (1993).

In Pakistan, some main initiatives that were immediately undertaken or given priority in terms of their speedy implementation were as follows:

- liberalization of external payments system[10]
- removal of items from the negative and restricted list of imports
- liberalization of capital account transactions
- initiation of privatization programme
- opening up of sectors previously reserved for the public enterprises
- relaxation of regulations for foreign and domestic investment
- administered price adjustments and financial sector reforms
- permission for residents to hold foreign currency accounts
- improvements in the structure of public finances by introducing general sales tax, withholding income tax, the removal of certain exemptions from direct and indirect taxes and curtailing current expenditure by the government.

It was, however, realized that there are certain preconditions before embarking on a path to liberalize the economy and promote pro-competition reforms. Initial conditions in the form of a sustainable fiscal deficit, restrained monetary expansion and price stability are important. These would provide an enabling environment and allow the private sector to take a leading role in the development process.

The tariffs had traditionally been a major source of revenue in

[10] Also included was the initiative of reducing the maximum tariff rates.

Pakistan.[11] Apart from the tariffs, imports were also subjected to other forms of taxes like Iqra surcharge,[12] flood relief surcharge, import license fee, excise duty and sales tax. The main arguments that went in favour of heavily taxing imports were straight from the textbook economics, *i.e.,* these duties were easier to administer, the collection costs were low, providing protection to domestic industries against foreign competition and curtailing the unnecessary import of luxury goods. As a consequence of these policies, Pakistan's industrial structure remained inefficient and heavily protected. Studies have shown that the effective rate of protection was high to the extent that it generated a strong anti-export bias in resource allocation.[13]

After this realization, comprehensive liberalization of tariff regime was pursued. By 2004-05, Pakistan had achieved considerable success in this area. The maximum tariff rate now stood at 25 percent. The quantum of overall trade, however, did not pick up proportionate to the decrease in tariff rates. Although the tariff rates were perpetually coming down during the period 2000 to 2006, however, the overall trade more or less showed a constant growth ranging between 25 to 30 percent of GDP, with exports around 10 to 13 percent of GDP. This points towards the importance of other factors apart from tariff liberalization that are impediments in boosting Pakistan's trade. See Planning Commission (2005).

In the current decade, Pakistan's trade volume as measured by the sum of exports and imports has remained on the rise. From 28.1 percent of GDP in 2000, it has risen up to 31.9 percent in 2007 (Figure 1). However, a minor concern has been the falling terms of trade (ToT). Treating 1991 as the base year with a ToT value of 100, it is shown in Figure 2 that this ratio has declined from 98 percent in 2000 to 58.4 percent in 2007. A falling terms of trade ratio will imply that the

[11] According to 1982-83 figures import duties accounted for 43 percent of total tax revenues.

[12] Tax collected for meeting educational expenses in the budget.

[13] This also implied that producers now had an incentive to operate in the protected industries and therefore create inefficiencies and bring about a decline in quality of output. Anti-export bias is defined as the situation where the effective rate of protection for importables exceeds the effective rate of subsidy for exportables. This is the definition generally used in the context of neutrality of trade incentives (See Bhagwati 1988, and Weiss 2005). The effective rate of protection (ERP) is defined as the percentage change in producer's value-added as a result of taxes on trade, over the level of value-added that would have prevailed in the absence of those taxes.

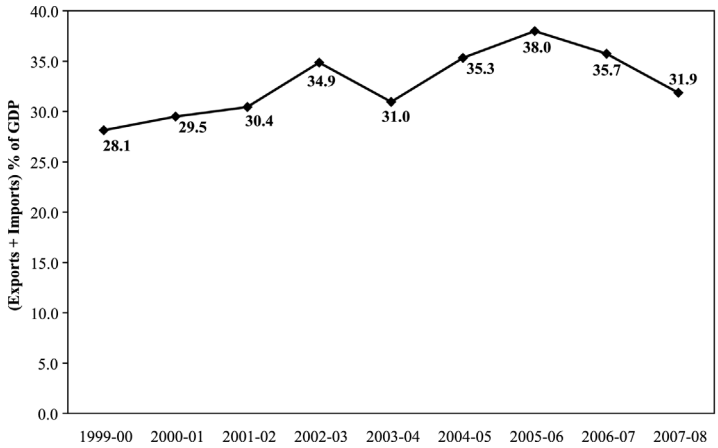

FIGURE 1
OVERALL TRADE (% OF GDP)

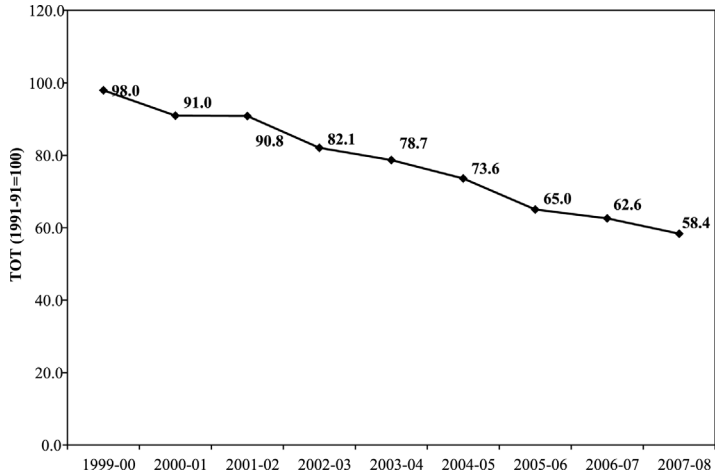

FIGURE 2
TERMS OF TRADE

country will have to pay more for its imports relative to its export earnings.

Pakistan's present day import policy focuses on: a) rationalization of tariff structure, b) reduction in non-tariff barriers, and c) simplification

of import regulations. The export policy includes: a) concessions related to income and sales tax, b) exemption from customs duty on imported intermediate inputs and capital goods, c) establishment of export processing zones, and d) easy access to credit facilities.

The economic theory tells us that a free trade milieu will raise economic efficiency, however as trade is liberalized some in the economy will suffer losses while others will become gainers. Pakistan's production sector may gain from further liberalization in trade as intermediate imports in Pakistan constitute about 60 percent of Pakistan's total imports. For ensuring national food security and to keep prices low without excessive intervention, the government has also allowed food products at a low or zero tariff rates. The average tariff rate as indicated by Pakistan Customs Tariff 2006 is now about 15%. Pakistan is now well below the bound levels of WTO and the maximum tariff rate in Pakistan is 25 percent. This also implies that a further decrease will bring an increase in imports and domestic consumption. The overall economic growth and capital accumulation also depends on the quality of imports. Raw material and supply chain components have greater multiplier linkages, while consumption goods have a higher tendency to contribute towards chronic trade deficits until and unless there is some possibility of re-export.

There have been some efforts in the recent past to study the general equilibrium effects of tariff reduction in Pakistan. Siddiqui and Iqbal (1999) using a CGE model study the impact of a reduction in tariff rates. The model follows the framework given in Decaluwe *et al.* (1996). Authors study the impact of a reduction in industrial sector's tariff rate by 80 percent. Their findings suggest that a reduction in tariff rates bring a decline in domestic prices which in turn increase the real incomes of the households. Apart from education, the consumption of all commodities has increased and the consumption of non-food group increased more than the food group.[14] Another study done for Pakistan by Kemal (2001), suggests the worsening of income distribution as a result of tariff reduction. There is an indication that gap between the rich and the poor widens.[15] Both these studies, however, use an older

[14] A revised version of this paper was submitted in 2001 and published in the MIMAP technical paper series No. 10.

[15] The paper provides justification from Bourguignon *et al.* (1991) who explain that there are three channels that affect income distribution: first, changes in factor rewards directly affect household income. Second, the changes in relative product prices also affect household income. As the consumption expenditure is

SAM for Pakistan.

IV. Data and Model

The main database for our CGE model has been derived from the SAM developed by Dorosh, Niazi, and Nazli (2006). This SAM is disaggregated enough to serve our purpose of evaluating the impacts of trade policy reforms. It has been constructed for the year 2001 and utilizes input-output table, national accounts data (2001) with information on output from 15 sectors, Pakistan Integrated Household Survey (2001) for consumption disaggregation, Pakistan Rural Household Survey (2001) for household income disaggregation and Federal Bureau of Statistics (FBS) data on production, prices and trade. The disaggregated SAM includes 34 activities with agriculture being represented by 12 activities, industry and services by 16 and 6 activities, respectively. Factor accounts have been disaggregated into 27 sub-types. Labour has 10 and land has 12 main categories provincially disaggregated into Sindh, Punjab and other Pakistan. Other factors of production include water, and capital in livestock, formal, informal and other-agro sectors.

Our model is the conventional CGE trade-focused framework in Ahmed and O'donoghue (2008), Bourguignon *et al.* (2005), and Lofgren *et al.* (2002). This model is tailored for the common specifications required for general equilibrium modeling of a developing economy. Some of the important features of low-income countries included in this model are: a) household consumption of non-marketed commodities, b) explicit treatment of transaction costs for marketed commodities, and c) separation between production activities and commodities (in this paper there is no separation). The overall model specification follows the neo-classical structuralist tradition which is explained in Dervis *et al.* (1982). Production and consumption decisions are modelled using non linear optimality conditions, *i.e.,* production and consumption decisions are based on the maximization of profits and utility respectively subject to the underlying budget constraints. Production technology at the top uses a CES specification. If the available production techniques permit the mix between value added and intermediate inputs to vary, then the CES function is preferable. The value addition has been treated as a CES

specified at the micro/household level thus the changes in prices may lead to diverse effects on individual income. Finally the capital gains and losses also ultimately affect the income levels.

function of primary inputs where as the overall intermediate input is a Leontief function of disaggregated intermediate inputs. Fixed yield coefficients determine if an activity produces one or multiple commodities. The aggregate revenue from an activity is then a function of the level of activity, yield and the producer prices of commodities. The factors of production are employed until the point where marginal revenue product of a particular factor becomes equal to its wage. Factor wages are allowed to vary across activities in order to correctly portray the situation where: a) markets are segmented, b) where factors are mobile, and c) where both abovementioned possibilities exist. The activity specific wage is calculated by multiplying the wage with a distortion term. This term differs across activities.

The households are receiving: a) income from the factors via enterprises, and b) transfers from other institutions such as the government and rest of the world (RoW). The household's income is exhausted in: a) consumption, b) savings, c) paying income taxes, and d) transfer payments to other institutions. Households are consuming two types of commodities that include the marketed commodities which are accounted at the market price (market price includes indirect taxes and transactions costs), and the home-produced commodities accounted at the producer prices. LES demand function is used to allocate the consumption across commodities.

The income received by enterprises is allocated to savings, payment of corporate (direct) taxes and transfers. The government is receiving taxes at fixed ad valorem rates and has a fixed consumption. However, the transfer payments made by the government to the households and enterprises are indexed with the level of consumer price index (CPI). The residual from government's income and consumption is treated as savings. The payments made by the RoW to domestic institutions (government, households, and enterprises) and factors are treated fixed. The overall domestic output from all activities is allocated between domestic turnover and exports. In this case, the assumption of imperfect transformability between exports and domestically sold goods is established using a CET function. Similarly on the import side, a CES function is used for modeling imperfect sustainability (also referred to as the Armington[16] assumption).

[16] This is the degree of substitutability between domestic and imported sources of supply. A higher value for Armington implies a higher possibility of substitution and vice versa.

For the current account balance, we maintain a flexible exchange rate. In case of savings-investment closure, the savings rates of institutions are adjusted in a manner that generates the precise amount of savings to finance the investment level. Hence savings are investment driven. The CPI is treated as a numeraire in the model. In our simulations, we will experiment with two different government closures namely fixed and flexible government savings.

V. Results

Our findings suggest an overall positive impact of trade liberalization on the macroeconomic variables and the welfare level. Table 1 provides two scenarios for tariff reduction. In the low-case scenario, the tariff rate is reduced by 50 percent and in the high-case scenario, the tariff rate is reduced by 80 percent.[17] The closures for both simulations have flexible government savings, fully employed but mobile labour, and fully employed but activity specific capital.

Probably the most encouraging result for a country like Pakistan is that the export growth shows the highest increase amongst the macroeconomic indicators. This also implies that the share of exports in overall GDP is increasing. What will be the general equilibrium explanation of such a result? As the tariff rates are slashed, this leads to a reduction in the domestic price level. If there is a substantial imported content of raw material and inputs to be used in the local industry that caters both domestic and foreign demand then the producer price index also declines. This implies that producers can now produce the previous level of output with a lesser cost structure thus making the home country's exports more competitive (Table 1).

Unlike Pakistan if the imported content in the home country's exports is not substantial, we can still explain an increase in exports through the external balance. A decrease in tariff rates implies cheaper foreign goods which induce a shift from the domestic goods towards imports. This in turn leads to a decline in domestic production. However, under such a situation the balance of trade deteriorates putting a downward pressure on the domestic currency. A reduction in the domestic price level relative to the foreign price level indicates that the home country's

[17] This reduction ranging between 50 to 80 percent was chosen in order to see if there are marked differences in results with respect to the choice of tariff rate.

TABLE 1
MACROECONOMIC RESULTS (% CHANGE FROM BASE)

Variables	Low-case scenario*	High-case scenario
Private Consumption	0.022	0.029
Fixed Investment	0.052	0.094
Govt. Consumption	0.385	0.628
Exports	3.028	4.952
Imports	2.520	4.120
GDP	0.591	0.960
*% Change in GDP by activity***		
Agriculture	0.370	0.590
Industry	1.370	1.610
Services	0.628	0.961

*Low-case scenario represents a 50% reduction in tariff, high-case scenario represents an 80% reduction in tariff (under default closures).
**GDP (fc).

TABLE 2
CHANGE IN THE SHARE OF GDP COMPONENTS (PERCENTAGE SHARE)

	Base	Low-case scenario*	High-case scenario	(B − A)	(C − A)
Share in Overall GDP	A	B	C		
Private Consumption	83.83	83.92	83.97	0.09	0.14
Fixed Investment	14.57	14.59	14.60	0.02	0.03
Govt. Consumption	11.57	11.63	11.66	0.05	0.09
Exports	19.46	20.06	20.45	0.61	0.99
Imports	-29.43	-30.19	-30.68	-0.77	-1.25
GDP	100.00	100.00	100.00	0.00	0.00

*Low-case scenario represents a 50% reduction in tariff, high-case scenario represents an 80% reduction in tariff.

exports have now become more attractive.

In both scenarios, private consumption and gross fixed capital formation are indicating an increase. However, the increase in government consumption is greater than the increase in private consumption and fixed investment. This can be explained by the structure of government's current expenditure. One of the main components of government spending is the debt servicing. In case of a depreciation of exchange rate (shown in Table 3) the interest payments on debt and the amortization become expensive thus pushing the government's current expenditure higher.

TABLE 3

IMPORTS, INTERMEDIATE INPUTS AND EXPORTS (% CHANGE FROM BASE)*

	Closure-1**	Closure-2
% Change in imports		
Agriculture	3.969	3.959
Industry	0.836	0.838
Services	-0.959	-0.961
% Change in intermediate inputs		
Agriculture	0.059	0.058
Industry	0.125	0.126
Services	-0.009	-0.009
% Change in Exchange Rate	1.529	1.531
% Change in exports		
Agriculture	1.962	1.969
Industry	1.578	1.580
Services	0.770	0.771

*50% cut in tariff rate.

**Closure-1: flexible government savings, Closure-2: fixed government savings.

In Table 1, the percentage change in GDP (at factor cost) by activity is exhibited. While all sectors show an increase, the highest increase is for the industrial sector followed by agriculture. This is because the impact of tariff reduction is more in relatively open sectors. Given the greater reliance of industry on imported raw material and machinery, this sector becomes the main beneficiary. Does tariff reduction also contributes to any change in the share of different aggregate demand components? Table 2 gives details of these shares. The shares increase for private consumption, fixed investment, government consumption and exports, however the imports decline. A distinction between import share in GDP and the overall import volume needs to be kept in perspective. In our case, we can see that while the import volume is clearly increasing, it is the share of imports (in GDP) in percentage terms that is decreasing. The decrease in the share of imports is indicating some facilitation towards the narrowing of the trade deficit (improvement in net exports).

Which sectors face a decline in imports? In Table 3, we see that the import for services sector declines. Industrial sector's imports increase because of two reasons. First the price effect makes the cheaper production goods from abroad more attractive and secondly there will be a scale effect as the resources are shifted towards the comparatively more profitable activities. We mentioned earlier that a reduction in the import

bill can favourably impact the intermediate demand in some sectors. We can see the percentage change in intermediate inputs as a result of tariff reduction in Table 3. The intermediate inputs increase for agriculture and industrial sectors. There is a marginal decrease in the intermediate input usage in services sector (primarily in transport and communication sub-sectors). The increase in the intermediate input usage in the industrial sector may be an indication of possible movement from traditional to more value-added goods. However, we cannot completely justify this without having a disaggregated activity-wise industrial structure in our model. Some of these sectoral results can be seen in a companion paper by Ahmed and O'Donoghue (2008).

In the same table, we can observe the sector-wise improvement in exports and the effect of exchange rate depreciation. The percentage change in the exports is highest for agriculture sector followed by industry. As textile is the main area of comparative advantage for Pakistan, therefore it is not surprising to note an increase in both agricultural (cotton) and industrial (textile) exports. The share of textile in the overall exports of Pakistan remains above 60 percent.

For our low-case scenario, we see the impact on disaggregated consumption and income under two different closure rules. In the first case, the government savings are flexible and in the second case, these savings are fixed. In both cases, the factors are mobile. A flexible government savings closure clears the government account and the direct tax rates are fixed. Under a fixed government savings closure, there is either a uniform direct tax rate change for selected institutions, or scaled direct tax rates for selected institutions. Table 4 indicates that the impact of tariff reduction on consumption is favourable for all household groups except those households who are farm owners. There seems to be some decline in rural consumption inequality because the highest increase in consumption is for the households who are not farm owners. This group in fact represents the median in overall rural consumption. Those households that see an increase in consumption levels gain more under a fixed government savings as compared to flexible government savings. This is partially due to the redistributive effect. The households that gain under the fixed government closure are mostly out of the direct tax net.

On the incomes side, Table 4 shows the percentage change in non-government institutional income. All institutions see an increase in income. The highest gain is for the enterprises followed by households that are non-farm, non-poor. The increase is lowest for the farm owners.

TABLE 4

50% CUT IN TARIFF – IMPACT ON CONSUMPTION AND INCOME
(% CHANGE FROM BASE)

	Closure-1**	Closure-2
% Change in Hhs. Consumption		
H-1*	-0.263	-0.271
H-2	0.232	0.480
H-3	0.152	0.102
H-4	0.102	0.065
H-5	0.172	0.122
% Change in Non-govt. Institutional Income		
H-1	0.225	0.225
H-2	0.747	0.747
H-3	0.638	0.638
H-4	0.628	0.721
H-5	0.658	0.658
ENT	0.866	0.866
% Change in factor income		
F-1***	0.552	0.551
F-2	0.762	0.763
F-3	-0.174	-0.176
F-4	-0.402	-0.403
F-5	0.866	0.866

*H-1: Household (farm-owner), H-2: Household (non-farm, non-poor), H-3: Household (non-farm poor), H-4: Household (urban non-poor), H-5: Household (urban poor), EN: Enterprises.
**Closure-1: flexible government savings, Closure-2: fixed government savings.
***F-1: unskilled labour, F-2: skilled labour, F-3: land, F-4: agri-capital, F-5: non-agri-capital.

The income level of households that are: a) non-farm poor, b) urban non-poor, c) urban poor, increases by almost the same rate. The change for all institutions remains same under both closures, however, it is greater only in the case of households that are urban non-poor under fixed government savings. The results are mixed, if one looks at the factor-wise disaggregation of incomes. The percentage change in factor income is positive for unskilled labour, skilled labour, and non-agricultural capital, and negative for land and agricultural capital. The main beneficiary seems to be those working in the tertiary and upper level of secondary sectors. In our analysis, the gains are lowest for households that are farm owners, therefore it will be pertinent to see the factor-wise disaggregation of incomes of farm owners. In Table 5, we can observe that those farm owners who are losing have their in-

TABLE 5

FACTOR-WISE DISAGGREGATION OF INCOMES FOR FARM OWNERS
(% CHANGE FROM BASE)

	Closure-1**	Closure-2
H-1 _ F-1*	0.552***	0.551
H-1 _ F-4	-0.402	-0.403
H-1 _ F-5	0.866	0.866

*H-1_F-1: Household (farm owner) and unskilled labour, H-1_F-4: Household (farm owner) and agri-capital, H-1_F-5: Household (farm owner) and non-agri-capital.
**Closure-1: flexible government savings, Closure-2: fixed government savings.
***50% cut in tariff rate.

TABLE 6

EQUIVALENT VARIATION (RUPEE MILLION)[18]

Households	Closure-1**	Closure-2
H-1*	-2.233***	-2.418
H-2	0.863	1.771
H-3	0.295	0.185
H-4	1.405	0.880
H-5	0.260	0.173
Total	0.590	0.591

*H-1: Household (farm-owner), H-2: Household (non-farm, non-poor), H-3: Household (non-farm poor), H-4: Household (urban non-poor), H-5: Household (urban poor).
**Closure-1: flexible government savings, Closure-2: fixed government savings.
***50% cut in tariff rate.

comes associated with agricultural capital. These results, in fact, compliment our findings in Table 4.

The welfare effects can be shown in terms of the equivalent variation (Table 6). These results seem sensitive to the government closure rules. While the only losers (under both closures) are those falling in the category of farm owners, however, we see that households who are; non-farm, non-poor gain less under flexible government savings and households who are: a) non-farm poor, b) urban non-poor, and c) urban poor, gain less under fixed government savings. Hence the total equivalent

[18] EV=Hicksian equivalent variation. A positive value implies a welfare improvement and a negative value indicates a welfare worsening.

TABLE 7
EQUIVALENT VARIATION (RUPEE MILLION)

	CET					
	0.25	0.5	1	2	10	50
Tariff						
25%	0.192	0.243	0.319	0.415	0.623	0.719
50%	0.338	0.425	0.558	0.726	1.088	1.257
95%	0.462	0.580	0.759	0.987	1.477	1.707

TABLE 8
EXCHANGE RATE (PERCENTAGE CHANGE)

	CET					
	0.25	0.5	1	2	10	50
Tariff						
25%	0.97	0.88	0.78	0.68	0.29	0.20
50%	2.04	1.85	1.56	1.27	0.59	0.39
95%	3.89	3.60	3.12	2.53	1.17	0.78

variation is marginally higher under the fixed closure rule.

Finally, we need to explain the reliability and robustness of our results. Our model captures the process of trade liberalization with a small country assumption. Hence the world prices of exports and imports are exogenous, and the Armington and CET elasticities (amongst other elasticities) play an important role in the outcome of our results. In the case of Armington elasticities, a lower value implies smaller change in the ratio of domestic to imported consumption and vice versa. For CET elasticity, a lower value implies a lesser level of homogeneity between domestic and exported goods. To conduct a sensitivity analysis we look at the impact of a change in the values of CET on welfare (equivalent variation), real exchange rate, skilled and unskilled labor wages across different tariff cuts. Table 7 shows that the larger the decline in tariff rates the higher are the welfare gains, which in fact increase for larger values of CET. Table 8 shows the impact of changes in CET values on the real exchange rate across different levels of tariffs. We see that larger the decrease in tariff rates the greater will be the depreciation in the exchange rate. However, as the values of CET increase the real exchange rate shows lesser depreciation. Table 9 and Table 10 look at the impact on wages. For skilled and unskilled labor,

TABLE 9
WAGE: UNSKILLED LABOUR (PERCENTAGE CHANGE)

	CET					
	0.25	0.5	1	2	10	50
Tariff						
25%	0.19	0.19	0.29	0.29	0.38	0.29
50%	0.48	0.48	0.57	0.57	0.67	0.57
95%	0.95	0.95	1.05	1.15	1.34	1.15

TABLE 10
WAGE: SKILLED LABOUR (PERCENTAGE CHANGE)

	CET					
	0.25	0.5	1	2	10	50
Tariff						
25%	0.38	0.38	0.38	0.38	0.38	0.38
50%	0.75	0.75	0.75	0.85	0.85	0.84
95%	1.41	1.41	1.50	1.60	1.69	1.51

TABLE 11
WELFARE EFFECTS OF CHANGES IN ARMINGTON ELASTICITY*

Elasticity	EV**	Absolute Change	Percentage Change
$\sigma_A = 0.5$	0.298	-	-
$\sigma_A = 1$	0.490	0.192	64.4
$\sigma_A = 2$	0.691	0.201	41.0
$\sigma_A = 3$	0.860	0.169	24.5
$\sigma_A = 4$	0.998	0.138	16.0
$\sigma_A = 5$	1.118	0.120	12.0
$\sigma_A = 7$	1.322	0.097	7.9
$\sigma_A = 8$	1.411	0.089	6.7
$\sigma_A = 9$	1.494	0.083	5.9
$\sigma_A = 10$	1.571	0.077	5.2

*Under 50% cut in tariff.
**Equivalent Variation (Rupee Million).

the wages increase with larger levels of tariff cuts and decline for very high values of CET parameter.

Welfare effects are also sensitive to the elasticity of substitution between domestic and foreign supply. In Table 11, we show the change in welfare gains as a result of changes in the Armington elasticity.

These values are for a 50 percent cut in tariff rates. As the values of Armington elasticity increase, the level of equivalent variation also increases but at a diminishing rate. There is an absolute (and percentage change) increase in equivalent variation when the elasticity is increased from unity to 2. However from $\sigma_A = 3$ (and onwards), the increase in welfare gains is diminishing. For a detailed review on the sensitivity of results with respect to elasticity parameters under small and large country assumption, see Rege (2001).

The model treats CPI as the numeraire (fixed) and domestic producer price index is flexible. The savings-investment closure followed the investment-driven savings rule where a uniform change in propensity to save is considered for selected institutions. In the RoW closure, the exchange rate is flexible and the current account balance is fixed. For the labour market, factors are fully employed and mobile. This assumption may be closer to reality as Pakistan faced a shortage of skilled labour (between the years 2003 to 2005) and the wage rates were on the rise. Capital is assumed to be fully employed and activity specific. It is rational to assume the non-substitution (immobility) of capital, hence the reason for treating capital activity-specific. As labour is mobile, therefore we observe some movement of labour across sectors. In the case of unskilled labour, the demand for labour increases in agriculture and industrial sectors. In the case of skilled labour, the demand decreases in agriculture and services activities and increases in the industrial sector.

This paper is concerned largely with the after-effects of a tariff reduction. However, we do not suggest which approach should specifically be used in order to cut down the tariff rates. Briefly, we can mention here that the governments have five possible choices under para-13 of Doha Declaration. The first is the Uruguay Round (UR) approach which proposes an average overall tariff reduction along with a minimum reduction per tariff line. The second is the linear method where the same reduction rate across the board is applied. The linear method can be termed as a variant of the abovementioned UR approach. However, the linear approach is regarded superior for tackling with issues such as tariff peaks and tariff escalations. The third is the harmonization approach, also know as the Swiss formula, and proposes a higher rate of reduction in upper levels of tariff structure and also putting a ceiling on the level of tariffs. As implied by the name, this approach leads to a harmonization in tariffs across countries. The fourth is the banded approach which is a compromise between UR approach and

the Swiss formula, *i.e.,* tariffs of each country to be grouped in different bands and that there should be three bands for developed countries and four for developing countries. The actual tariff reduction with in each band will follow the UR approach, but there will be greater reduction for higher bands. The fifth is the blended approach which again is a compromise between the UR and Swiss methodologies, where selected tariffs would be subject to the UR type cuts, and this will also be an expansion of tariff rate quotas. It has been difficult for the WTO member countries to reach a conclusion based on consensus, especially for the more crucial items / categories now halting the negotiations. Most of these belong to the agricultural group. However, two recent efforts are worth mentioning here. The G-20 proposal recommends the developing countries to follow a UR approach and developed countries to follow a blended approach. Another proposal forwarded by the Chairman of WTO General Council (before the Cancun meeting) also recommends the blended approach for developed countries, but the developing countries can choose from two alternatives: a) banded approach with expansion of tariff rate quotas for the higher band, and b) blended approach without any maximum tariff condition. We cannot discuss these debates in detail here, however, a comprehensive summary of these proposals has been provided in Vlahantoni-Tikof (2005).

VI. Conclusion

This paper provides a general equilibrium analysis of the trade liberalization process in Pakistan. We study the impact of a reduction in overall tariff rates under different closure rules and a range of CET and Armington elasticities. Our findings suggest an overall positive impact of slashing tariff rates on the welfare levels. The exports in particular benefit from the reduced prices of imported raw materials and related inputs. The two main components of aggregate demand namely; private consumption and gross fixed capital formation both show an increase. Households that see an increase in consumption levels gain more under fixed government savings closure as compared to a flexible government savings closure. All domestic non-government institutions see an increase in income. The highest gain is for enterprises followed by households that are non-farm, non-poor. The increase is, however, lowest for the farm owners. The income level of house-holds that are: a) non-farm poor, b) urban non-poor, and c) urban poor also increase.

The CGE model in this paper captures only the static effects that arise from the increased efficiency of resource allocation. It does not capture the dynamic effects of trade liberalization including pro-competitive effects and capital accumulation effects.

Trade liberalization will accrue benefits for a country if its exporting sectors expand and compensate for the increased imports. Tariff reforms need to be accompanied by domestic taxation reforms and productivity gains.[19] In the case of the former, distortionary forms of taxation such as the excise duties with multiple rates should be entirely replaced with a uniform VAT in order to reduce inefficiencies on the production side. In Pakistan, there is a need to broaden the GST base. As for the latter, an improvement in overall productivity (*i.e.,* the amount of output per unit of input) is essential in order to maintain the comparative advantage and preserve/increase the share in global trade.[20] The quality improvements play a greater role in the quota-free environment and can guarantee the benefits from the elimination of tariff and non-tariff barriers.

(Received 29 June 2009; Revised 19 November 2009; Accepted 21 November 2009)

References

Ahmed, Vaqar, and O' Donoghue, Cathal. Welfare Impact of External Balance in Pakistan: CGE-Microsimulation Analysis. GTAP Conference Poceedings at the 11th Annual Conference on Global Economics Analysis, Helsinki, Finland, 2008.

Anderson, J. E. "A Theoretical Foundation for the Gravity Equation." *American Economic Review* 69 (No. 1 1979): 106-16.

Anderson, K., Dimaran, B., Francois, J., Hertel, T., and Hoekman, B. "The Cost of Rich (and Poor) Country Protection to Developing Countries." *Journal of African Economies* 10 (No. 3 2003): 227-57.

Anderson, K., Martin, W., and Mensbrugghe, Dominique Van Der. "Market and Welfare Implications of the Doha Reform Scenarios." In K. Anderson and W. Martin (eds.), *Agricultural Trade*

[19] See Lee and Pyo (2007) for an empirical investigation into the drivers of productivity growth in Korean economy. See also Kim (2009).

[20] See Kwark (2005).

Reform and the Doha Development Agenda. Chapter 12, Washington D.C.: World Bank, pp. 333-99, 2005.

Annabi, N., Cockburn, J., and Decaluwe, B. Functional Forms and Parameterization of CGE Models. PEP MPIA Working Paper 2006-04, http://132.203.59.36:81/Group/papers/papers/MPIA-2006-04.pdf, 2006.

Bhagwati, J. "Export-Promoting Trade Strategy: Issues and Evidence." *The World Bank Research Observer* 3 (No. 1 1988): 27-57.

Bhagwati, Jagdish, and Hudec, Robert E. *Fair Trade and Harmonization: Prerequisites for Free Trade?* Vol. 1, Economic Analysis, Cambridge, MA, USA: MIT Press, 1996.

Bhagwati, J., and Srinivasan, T. N. "Trade and Poverty in the Poor Countries." *AEA Papers and Proceedings* 92 (No. 2 2002): 180-3.

Bohringer, C., Rutherford, T. F., and Wiegard, W. Computable General Equilibrium Analysis: Opening a Black Box. ZEW Discussion Paper No. 03-56, http://bibserv7.bib.uni-mannheim.de/madoc/volltexte/2004/363/pdf/dp0356.pdf, 2004.

Bouët, A. What Can the Poor Expect from Trade Liberalization? Opening the Black Box of Trade Modelling. MTID Discussion Paper No. 93, IFPRI, 2006.

Bourguignon, Francois, Jaime, de Melo, and Suwa, Akiko. Distributional Effects of Adjustment Policies: Simulations for Two Archetypes Economies. Policy Research Working Paper Series 674, The World Bank, 1991.

Bourguignon, Francois, Robilliard, Anne, and Robinson, Sherman. "Representative versus Real Households in the Macroeconomic Modeling of Inequality." In T. J. Kehoe, T. N. Srinivasan, and John Whalley (eds.), *Frontiers in Applied General Equilibrium Modelling*. Cambridge: Cambridge University Press, pp. 219-54, 2005.

Brown, D. K., Deardorff, A. V., and Stern, R. M. "Multilateral, Regional and Bilateral Trade Policy Options for the United States and Japan." *The World Economy* 26 (No. 6 2003): 803-28.

Cline, W. R. *Trade Policy and Global Poverty.* Washington D.C.: Peterson Institute for International Economics, 2004.

Cloutier, M., Cockburn, J., and Decaluwe, B. *Welfare, Poverty and Distributional Effects of Trade Liberalization: A Review of the CGE Literature.* Mimeo, Universite Laval: Poverty and Economics Policy Network, 2003.

Cockburn, J., Decaluwe, B., and Robichaud, V. *Trade Liberalization and Poverty: A CGE Analysis of the 1990s Experience in Africa and Asia.* Quebec, Canada: IDRC, 2008.

Davey, W. J., and Pauwelyn, J. "MFN-Unconditionality." In T. Cottier and P. C. Mavroidis (eds.), *Regulatory Barriers and the Principle of Non-Discrimination in World Trade Law: Past, Present, and Future.* University of Michigan Press, pp. 38-41, 2000.

Decaluwe, B., Martin, M. C., and Souissi, M. *Ecole PARADI de modelisation de Politiques Economiques de Development.* Québec: Universite Laval, 1996. (in French)

Dervis, K., Melo, J. de, and Robinson, S. *General Equilibrium Models for Development Policy*. New York: Cambridge University Press, 1982.

Dorosh, P., Niazi, M. K., and Nazli, H. A Social Accounting Matrix for Pakistan, 2001-02: Methodology and Results. Pakistan Institute of Development Economics Working Papers 2006: 9, 2006.

Ethier, W. J. "Theoretical Problems in Negotiating Trade Liberalization." *European Journal of Political Economy* 17 (No. 2 2001): 209-32.

_____. "Unilateralism in a Multilateral World." *Economic Journal* 112 (No. 479 2002): 266-92.

Francois, J., Meijl, H. Van, and Tongeren, F. Van. Trade Liberalization and Developing Countries under the Doha Round. CEPR Discussion Paper No. 4032, 2003.

Francois, J. F., and Reinert, K. A. *Applied Methods for Trade Policy Analysis: A Handbook*. Cambridge: Cambridge University Press, 2008.

Guisinger, S., and Scully, G. "Liberalising Foreign Trade: Lessons of Experience in the Developing World." In D. Papageorgiou, M. Michaely, and A. M. Choksi (eds.), *Liberalizing Foreign Trade: Lessons of Experience in the Developing World.* Oxford: Oxford University Press, pp.197-282, 1991.

Hertel, T. W. Future Directions in Global Trade Analysis. GTAP Working Paper No. 4, Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, 1999.

Hillman, A. L. Trade Liberalization and Globalization: A Survey. International Trade and Public Policy Discussion Paper Series No. 3845, Center for Economic Policy Research, UK, 2003.

Horn, H., and Mavroidis, P. "Economic and Legal Aspects of the Most-Favored-Nation Clause." *European Journal of Political Economy* 17 (No. 2 2001): 233-79.

Jacob, J., and Meister, C. "Productivity Gains, Technology Spillovers and Trade: Indonesian Manufacturing, 1980-96." *Bulletin of Indonesian Economic Studies* 41 (No. 1 2005): 37-56.

Kemal, A. R. Structural Adjustment, Macroeconomic Policies and Poverty Trends in Pakistan. Paper presented at Asia and Pacific Forum on Poverty: Reforming Policies and Institutions for Poverty Reduction, Asian Development Bank, Manila, 5-9 February, 2001.

Khan, H. Assessing Poverty Impact of Trade Liberalization Policies: A Generic Macroeconomic Computable General Equilibrium Model for South Asia. ADB Institute Discussion Paper No. 22, 2005.

Khor, M. *The Singapore Issues in the WTO: Implications and Recent Developments*. Malaysia: Third World Network, 2004.

Kim, Hag-Soo. "Empirical Evidence on the Determinants of TFP and Its Role in the Growth of Innovation-Driven Economies." *Seoul Journal of Economics* 22 (No. 1 2009): 55-75.

Kim, Taegi, and Zhan, Jun-Heng. "Industrial Structure, Regional Trade Bias, and China's FTA with Korea and Japan." *Seoul Journal of Economics* 19 (No. 4 2006): 381-404.

Krueger, A. O. *Trade Policies and Developing Nations*. Washington D. C.: The Brookings Institution, 1995.

Krugman, P. "Growing World Trade: Causes and Consequences." *Brookings Papers on Economic Activity* 26 (No. 1 1995): 327-77.

Kwark, Noh-Sun. "Long-Run Comparative Advantage and Transitional Dynamics after Free Trade in an Endogenous Growth Model." *Seoul Journal of Economics* 18 (No. 2 2005): 173-203.

Kydd, J., Dorward, A., and Poulton, C. Institutional Dimensions of Trade Liberalisation and Poverty. Paper Presented at OECD Global Forum on Agriculture, Meeting on Agricultural Trade Reform, Adjustment and Poverty, 23/24th May, 2002.

Lee, Young Hoon, and Pyo, Hak K. "Productivity Growth and Patterns of Efficiency Changes in Korean Economy: Stochastic Frontier Approach with Industry-Panel Data." *Seoul Journal of Economics* 20 (No. 1 2007): 23-58.

Lofgren, H., Harris, R. L., and Robinson, S. A Standard Computable General Equilibrium Model in GAMS. Microcomputers in Policy Research 5, International Food Policy Research Institute, 2002.

McKibbin, W. J. Quantifying APEC Trade Liberalization: A Dynamic Analysis. Paper Prepared for the Economic Modeling Bureau of Australia: Conference on Changing Patterns of Interdependence

in the Asia-Pacific Region held in Cairns, Australia, August, 1996.

OECD. The Doha Development Agenda: Welfare Gains from Further Multilateral. Trade Liberalization with Respect to Tariffs. TD/TC/WP(2003)10/FINAL, Paris, 2003.

Page, S. Principle Issues in the Doha Negotiations. in the Doha Development Agenda Impacts on Trade and Poverty, Overseas Development Institute, http://www.odi.org.uk/resources/ download/2265.pdf, 2004.

Pauw, K. Functional Forms Used in CGE Models: Modelling Production and Commodity Flows. PROVIDE Project Background Paper 2003: 5, 2003.

Piermartini, R. Demystifying Modeling Methods for Trade Policy. WTO Discussion Paper No. 10, 2006.

Planning Commission. *Medium Term Development Framework 2005-10,* Islamabad, Pakistan, Islamabad: Government of Pakistan, 2005.

Rege, S. R. "General Equilibrium Analysis of India's Trade Reforms." *Review of Urban and Regional Development Studies* 13 (No. 2, 2001): 123-42.

Rodrik, Dani. *The New Global Economy and Developing Countries: Making Openness Work*. Washington: Overseas Development Council, 1999.

Santos-Paulino, A., and Thirlwall, A. P. *The Impact of Trade Liberalization on Export Growth, Import Growth, the Balance of Trade and the Balance of Payments of Developing Countries.* Kent, UK: University of Kent, 2002.

Shafaeddin, S. M. Trade Liberalization and Economic Reform in Developing Countries: Structural Change or De-industrialization? UNCTAD Discussion Paper No. 179, 2005.

Siddiqui, Rizwana, and Iqbal, Zafar. Tariff Reduction and Functional Income Distribution in Pakistan: A CGE Model. Paper Presented at the Workshop on Micro Impact of Macroeconomic Adjustment Policies, Islamabad, Pakistan, November, 1999.

Tarjanne, P., Leive, D. M., and Tyler, M. *The Changing Role of Government in an Era of Telecom Deregulation*. Geneva: International Telecommunications Union, 1995.

Vlahantoni-Tikof, M. WTO Negotiations on Agriculture: Tariff Reduction Formula. Technical Assistance to Support ACP Country Delegations in Geneva on Post-July Framework Process, 2005.

Weiss, J. Export Growth and Industrial Policy: Lessons from the East

Asian Miracle Experience. ADB Institute Discussion Paper No. 26, 2005.

Willenbockel, D. Specification Choice and Robustness in CGE Trade Policy. Analysis with Imperfect Competition. ECOMOD Conference Proceedings, 2002.

Winters, A. L., McCulloch, N., and McKay, A. "Trade Liberalization and Poverty: The Evidence So Far." *Journal of Economic Literature* 42 (No. 1 2004): 72-115.

Wood, Adrian. "How Trade Hurt Unskilled Workers." *Journal of Economic Perspectives* 9 (No. 3 1995): 57-80.

World Bank. The East Asian Miracle: Economic Growth and Public Policy. World Bank Policy Research Report, 1993.

UNCTAD. Back to Basics: Market Access Issues in the Doha Agenda. United National Conference on Trade and Development, Geneva, 2003.

Yallapragada, R. R., Roe, C. W., Paruchuri, M. R., and Toma, A. G. The Collapse at Cancun: The Fifth Ministerial Conference of the World Trade Organization. Southwestern Economic Review Proceedings, http://www.ser.tcu.edu/2005-Pro/SEP2005%20Yallapragada%20et%20al%20II%2065-70.pdf, 2005.